

In the Claims:

1. (previously presented) An apparatus for determining an
2 unbalance of a rotational body when said rotational body is
3 mounted on said apparatus so as to be rotatable about a
4 rotation axis, said apparatus comprising:

5 a mounting plate extending along and defining a plate
6 plane;

7 a mounting fixture that is arranged on said mounting
8 plate, and that is adapted to receive the rotational body
9 mounted thereon so as to allow the rotational body to
10 rotate about said rotation axis, wherein said rotation axis
11 is oriented perpendicular to said plate plane;

12 an outer frame arranged at least partially outwardly
13 around said mounting plate;

14 plural pairs of webs on said plate plane, said webs
15 respectively connecting said mounting plate to said outer
16 frame in an arrangement of said webs that is symmetrical
17 relative to said rotation axis, wherein said webs are so
18 configured and arranged so as to support said mounting
19 plate relative to said outer frame, to transmit from said
20 mounting plate to said outer frame all axially directed
21 forces that are oriented along said rotation axis and that
22 are not induced by the unbalance of the rotational body,
23 and to allow said mounting plate to undergo translational
24 vibration relative to said outer frame in said plate plane,
25 wherein said translational vibration is induced in said
26 mounting plate by the unbalance of the rotational body; and

27 a first vibration transducer arrangement that is
28 coupled to said outer frame and to said mounting plate, and
29 that is so arranged and adapted to detect said
30 translational vibration of said mounting plate relative to
31 said outer frame in said plate plane.

- 1 2. (original) The apparatus according to claim 1, wherein said
2 webs are further so configured and arranged so as to define
3 a pivot axis perpendicular to said rotation axis, and so as
4 to allow said mounting plate to undergo pivotal vibration
5 relative to said outer frame about said pivot axis, wherein
6 said pivotal vibration is induced in said mounting plate by
7 the unbalance of the rotational body.
- 1 3. (original) The apparatus according to claim 2, further
2 comprising a second vibration transducer arrangement that
3 is coupled to said outer frame and to said mounting plate,
4 and that is so arranged and adapted to detect said pivotal
5 vibration of said mounting plate relative to said outer
6 frame about said pivot axis.
- 1 4. (original) The apparatus according to claim 3, wherein said
2 first vibration transducer arrangement has a first
3 effective measuring axis that is oriented always
4 perpendicular to said pivot axis and substantially
5 perpendicular to said rotation axis, and said second
6 vibration transducer arrangement has a second effective
7 measuring axis that is oriented substantially perpendicular

8 to said plate plane at a location offset from said pivot
9 axis.

1 5. (original) The apparatus according to claim 3, wherein said
2 first vibration transducer arrangement has a first
3 effective measuring axis that is oriented coincident with
4 said pivot axis, and said second vibration transducer
5 arrangement has a second effective measuring axis that is
6 oriented substantially perpendicular to said plate plane at
7 a location offset from said pivot axis.

1 6. (original) The apparatus according to claim 3, wherein said
2 mounting plate comprises a plate body on which said
3 mounting fixture is arranged and an extension arm
4 protruding outwardly from said plate body, said outer frame
5 comprises a plurality of frame members arranged outwardly
6 around said mounting plate and a frame protrusion that
7 protrudes from at least one of said frame members away from
8 said plate plane and that defines a clearance space
9 therein, a free end of said extension arm extends into said
10 clearance space, and said second vibration transducer
11 arrangement is coupled to said free end of said extension
12 arm and to said frame protrusion in said clearance space.

1 7. (original) The apparatus according to claim 3, wherein each
2 one of said vibration transducer arrangements respectively
3 comprises a vibration transducer connected to said outer
4 frame, and an elastically bendable coupling rod

5 that is connected to said mounting plate and cooperates
6 with said transducer to couple said transducer to said
7 mounting plate.

1 8. (original) The apparatus according to claim 3, wherein at
2 least one of said vibration transducer arrangements has a
3 respective effective measuring axis, and is adjustably
4 secured to at least one of said outer frame and said
5 mounting plate so as to be slidably adjustable and
6 selectively fixable in a direction parallel to said
7 effective measuring axis.

1 9. (original) The apparatus according to claim 3, further
2 comprising a third vibration transducer arrangement that is
3 coupled to said outer frame and to said mounting plate, and
4 that is so arranged and adapted to detect said pivotal
5 vibration of said mounting plate relative to said outer
6 frame about said pivot axis, wherein said second and third
7 vibration transducer arrangements are respectively located
8 spaced away from said pivot axis on two opposite sides of
9 said pivot axis.

1 10. (original) The apparatus according to claim 2, wherein said
2 pivot axis always lies in said plate plane.

1 11. (original) The apparatus according to claim 2, wherein said
2 webs include a first pair of webs that extend along and
3 parallel to said pivot axis respectively on opposite sides

4 of said mounting plate and that define said pivot axis,
5 said webs further include a second pair of webs and a third
6 pair of webs that respectively extend parallel to each
7 other and parallel to said first pair of webs in said plate
8 plane, and said second pair of webs and said third pair of
9 webs are located respectively spaced equidistantly from
10 said pivot axis on opposite sides of said pivot axis.

1 12. (original) The apparatus according to claim 11, wherein
2 said webs of said second and third pairs of webs each
3 respectively comprise a flexible sectional bar member
4 having a square, rectangular, polygon or circular
5 cross-sectional shape.

1 13. (original) The apparatus according to claim 11, wherein
2 said webs of said second and third pairs of webs each
3 respectively have at least one notch therein positioned so
4 as to increase a flexibility of each respective said web in
5 a direction perpendicular to said plate plane.

1 14. (original) The apparatus according to claim 2, wherein:
2 said webs include first, second and third pairs of
3 webs;
4 said webs of each said pair are arranged axially
5 aligned with each other respectively on opposite sides of
6 said mounting plate;
7 said webs of said first pair of webs extend along and
8 parallel to said pivot axis to define said pivot axis;

9 said webs of said first pair of webs are relatively
10 more flexible with respect to torsion about said pivot axis
11 so as to allow said pivotal vibration of said mounting
12 plate and with respect to bending in said plate plane so as
13 to allow said translational vibration of said mounting
14 plate, and are relatively less flexible with respect to
15 bending perpendicular to said plate plane so as to support
16 and transmit said forces from said mounting plate to said
17 outer frame;

18 said webs of said second and third pairs of webs are
19 flexible with respect to bending in said plate plane so as
20 to allow said translational vibration of said mounting
21 plate and with respect to bending perpendicular to said
22 plate plane so as to allow said pivotal vibration of said
23 mounting plate; and

24 said webs of said first pair are stiffer than said
25 webs of said second and third pairs with respect to bending
26 perpendicular to said plate plane.

1 15. (original) The apparatus according to claim 2, wherein said
2 webs include a first pair of webs that extend along and
3 parallel to said pivot axis respectively on respective
4 opposite sides of said mounting plate, and second and third
5 pairs of webs that extend perpendicular to said pivot axis
6 on respective opposite sides of said mounting plate.

1 16. (original) The apparatus according to claim 1, wherein said
2 mounting plate has a rectangular plan shape including two

3 long sides and two short sides meeting each other at
4 respective ends, and said webs include a first pair of webs
5 arranged at a center of said long sides, and second and
6 third pairs of webs arranged at said ends of said long
7 sides.

1 17. (original) The apparatus according to claim 1, wherein at
2 least one of said webs has at least one notch therein
3 positioned so as to increase a flexibility of said web with
4 respect to bending in said plate plane.

1 18. (original) The apparatus according to claim 1, wherein said
2 rotation axis is oriented substantially vertically, and
3 said plate plane is oriented substantially horizontally.

1 19. (original) The apparatus according to claim 1, wherein said
2 rotation axis is oriented substantially horizontally, and
3 said plate plane is oriented substantially vertically.

1 20. (original) The apparatus according to claim 1, wherein said
2 webs include a first pair of webs that extend along an
3 intersection of said plate plane and a plane containing
4 said rotation axis.

1 21. (original) The apparatus according to claim 20, wherein
2 said webs of said first pair each respectively have a
3 cross-sectional shape that is flexurally stiff in a
4 direction so as to resist bending due to said forces that

5 are oriented along said rotation axis and are not induced
6 by the unbalance of the rotational body.

1 22. (original) The apparatus according to claim 21, wherein
2 said cross-sectional shape is a rectangular cross-sectional
3 shape having longer rectangle sides oriented perpendicular
4 to said plate plane.

1 23. (original) The apparatus according to claim 1, wherein said
2 mounting plate is connected and supported relative to said
3 outer frame only by said webs, and expressly excluding all
4 additional supports for said mounting plate and for the
5 rotational body.

1 24. (original) The apparatus according to claim 1, wherein said
2 mounting plate, said webs and said outer frame are
3 integrally formed with one another so as to form thereof a
4 single integral component.

1 25. (original) The apparatus according to claim 1, wherein each
2 one of said vibration transducer arrangements respectively
3 comprises a vibration transducer connected to said outer
4 frame, and an elastically flexibly bendable coupling rod
5 that is connected to said mounting plate and cooperates
6 with said transducer to couple said transducer to said
7 mounting plate.

1 26. (currently amended) A method of determining an unbalance of
2 a rotational body, comprising the following steps:

3 a) mounting said rotational body on a mounting fixture of
4 a dynamometer element;
5 b) rotating said rotational body mounted on said fixture
6 about a rotational axis;
7 c) transferring all forces and moments originating from
8 said rotational body into and through said dynamometer
9 element, thereby causing at least a portion of said
10 dynamometer element to undergo at least one of
11 translational vibration in a plane of said dynamometer
12 element and pivotal vibration about a pivot axis; and
13 d) separately detecting a first one of said pivotal
14 vibration and said translational vibration separately
15 from a second other one of said vibrations using only
16 a first sensor that is sensitive to only said first
17 one of said vibrations without being sensitive to said
18 second other one of said vibrations.

1 27. (previously presented) An apparatus for determining an
2 unbalance of a rotational body when said rotational body is
3 mounted on said apparatus so as to be rotatable about a
4 rotation axis, said apparatus comprising:

5 a mounting plate extending along and defining a plate
6 plane;
7 a mounting fixture that is arranged on said mounting
8 plate, and that is adapted to receive the rotational body
9 mounted thereon so as to allow the rotational body to

10 rotate about said rotation axis, wherein said rotation axis
11 is oriented perpendicular to said plate plane;

12 an outer frame arranged at least partially outwardly
13 around said mounting plate;

14 a plurality of webs respectively connecting said
15 mounting plate to said outer frame, wherein said webs are
16 so configured and arranged so as to support said mounting
17 plate relative to said outer frame, to transmit from said
18 mounting plate to said outer frame forces that are oriented
19 along said rotation axis and that are not induced by the
20 unbalance of the rotational body, to allow said mounting
21 plate to undergo translational vibration relative to said
22 outer frame in said plate plane, wherein said translational
23 vibration is induced in said mounting plate by the
24 unbalance of the rotational body, to define a pivot axis
25 perpendicular to said rotation axis, and to allow said
26 mounting plate to undergo pivotal vibration about said
27 pivot axis; and

28 a first vibration transducer arrangement that is
29 coupled to said outer frame and to said mounting plate, and
30 that is so arranged and adapted to detect said
31 translational vibration of said mounting plate relative to
32 said outer frame in said plate plane;

33 wherein said webs include a first pair of webs that
34 extend along and parallel to said pivot axis respectively
35 on opposite sides of said mounting plate and that define
36 said pivot axis, said webs further include a second pair of
37 webs and a third pair of webs that respectively extend

38 parallel to each other and parallel to said first pair of
39 webs in said plate plane, and said second pair of webs and
40 said third pair of webs are located respectively spaced
41 equidistantly from said pivot axis on opposite sides of
42 said pivot axis.

1 28. (previously presented) An apparatus for determining an
2 unbalance of a rotational body when said rotational body is
3 mounted on said apparatus so as to be rotatable about a
4 rotation axis, said apparatus comprising:

5 a mounting plate extending along and defining a plate
6 plane;

7 a mounting fixture that is arranged on said mounting
8 plate, and that is adapted to receive the rotational body
9 mounted thereon so as to allow the rotational body to
10 rotate about said rotation axis, wherein said rotation axis
11 is oriented perpendicular to said plate plane;

12 an outer frame arranged at least partially outwardly
13 around said mounting plate;

14 a plurality of webs respectively connecting said
15 mounting plate to said outer frame, wherein said webs
16 entirely support said mounting plate relative to said outer
17 frame, said webs include a first pair of webs that extend
18 axially aligned with one another along a pivot axis
19 perpendicular to said rotation axis on opposite sides of
20 said mounting plate and further webs offset away from said
21 pivot axis, said webs of said first pair are torsionally
22 flexible about said pivot axis to allow said mounting plate

23 to undergo pivotal vibration about said pivot axis and are
24 flexurally stiff with respect to bending perpendicular to
25 said plate plane, and said further webs are flexible with
26 respect to bending perpendicular to said plate plane so as
27 to allow said pivotal vibration of said mounting plate and
28 with respect to bending in said plate plane so as to allow
29 said mounting plate to undergo translational vibration in
30 said plate plane;

31 a first vibration transducer arrangement that is
32 coupled to said outer frame and to said mounting plate, and
33 that is so arranged and adapted to detect said
34 translational vibration of said mounting plate relative to
35 said outer frame in said plate plane; and

36 a second vibration transducer arrangement that is
37 coupled to said outer frame and to said mounting plate, and
38 that is so arranged and adapted to detect said pivotal
39 vibration of said mounting plate relative to said outer
40 frame about said pivot axis.

1 29. (previously presented) The apparatus according to claim 28,
2 wherein all of said further webs extend parallel relative
3 to said webs of said first pair and relative to said pivot
4 axis.

1 30. (previously presented) The apparatus according to claim 28,
2 wherein all of said further webs extend respectively
3 perpendicularly relative to said webs of said first pair
4 and relative to said pivot axis.

- 1 31. (previously presented) The apparatus according to claim 28,
2 wherein said further webs are arranged symmetrically on
3 opposite sides of said pivot axis.
- 1 32. (previously presented) The apparatus according to claim 1,
2 wherein said apparatus includes only a single one of said
3 mounting plate, and said plural pairs of webs on said plate
4 plane provide the only and entire support of said mounting
5 plate.
- 1 33. (previously presented) The apparatus according to claim 1,
2 wherein all of said pairs of webs are parallel to each
3 other on said plate plane.
- 1 34. (previously presented) The apparatus according to claim 1,
2 wherein said pairs of webs include one pair of said webs
3 that is oriented perpendicular to another pair of said webs
4 on said plate plane.
- 1 35. (previously presented) The apparatus according to claim 1,
2 wherein said first vibration transducer arrangement has a
3 first effective measuring axis that lies in the same plane
4 as all of said plural pairs of webs.

- 1 36. (previously presented) The apparatus according to claim 3,
2 wherein said second vibration transducer arrangement has a
3 second effective measuring axis that is oriented
4 substantially parallel to said rotation axis and
5 substantially perpendicular to said plate plane.
- 1 37. (previously presented) The apparatus according to claim 3,
2 wherein said first and second vibration transducer
3 arrangements are both coupled directly to said outer frame
4 and directly to said mounting plate.
- 1 38. (previously presented) The apparatus according to claim 3,
2 wherein said first and second vibration transducer
3 arrangements respectively have first and second effective
4 measuring axes that are oriented perpendicular relative to
5 each other.
- 1 39. (previously presented) The apparatus according to claim 3,
2 wherein said first vibration transducer arrangement is
3 arranged and oriented to detect only said translational
4 vibration without being sensitive to said pivotal
5 vibration, and said second vibration transducer arrangement
6 is arranged and oriented to detect only said pivotal
7 vibration without being sensitive to said translational
8 vibration.

1 40. (currently amended) The method according to claim 26,
2 further comprising, simultaneously during said step d),
3 separately detecting said second other one of said
4 vibrations separately from said first one of said
5 vibrations using only a second sensor that is sensitive to
6 only said second other one of said vibrations without being
7 sensitive to said first one of said vibrations.

1 41. (previously presented) An apparatus for determining an
2 unbalance of a rotational body when said rotational body is
3 mounted on said apparatus so as to be rotatable about a
4 rotation axis, said apparatus comprising:

5 a mounting plate extending along and defining a plate
6 plane;

7 a mounting fixture that is arranged on said mounting
8 plate, and that is adapted to receive the rotational body
9 mounted thereon so as to allow the rotational body to
10 rotate about said rotation axis, wherein said rotation axis
11 is oriented perpendicular to said plate plane;

12 an outer frame arranged at least partially outwardly
13 around said mounting plate;

14 a plurality of webs respectively connecting said
15 mounting plate to said outer frame in an arrangement of
16 said webs that is symmetrical relative to said rotation
17 axis, wherein said webs are so configured and arranged so
18 as to support said mounting plate relative to said outer
19 frame, to transmit from said mounting plate to said outer
20 frame all axially directed forces that are oriented along

21 said rotation axis and that are not induced by the
22 unbalance of the rotational body, and to allow said
23 mounting plate to undergo translational vibration relative
24 to said outer frame in said plate plane, wherein said
25 translational vibration is induced in said mounting plate
26 by the unbalance of the rotational body; and

27 a first vibration transducer arrangement that is
28 coupled to said outer frame and to said mounting plate, and
29 that is so arranged and adapted to detect said
30 translational vibration of said mounting plate relative to
31 said outer frame in said plate plane;

32 wherein said webs are further so configured and
33 arranged so as to define a pivot axis perpendicular to said
34 rotation axis, and so as to allow said mounting plate to
35 undergo pivotal vibration relative to said outer frame
36 about said pivot axis, wherein said pivotal vibration is
37 induced in said mounting plate by the unbalance of the
38 rotational body;

39 further comprising a second vibration transducer
40 arrangement that is coupled to said outer frame and to said
41 mounting plate, and that is so arranged and adapted to
42 detect said pivotal vibration of said mounting plate
43 relative to said outer frame about said pivot axis; and

44 wherein said mounting plate comprises a plate body on
45 which said mounting fixture is arranged and an extension
46 arm protruding outwardly from said plate body, said outer
47 frame comprises a plurality of frame members arranged
48 outwardly around said mounting plate and a frame protrusion

49 that protrudes from at least one of said frame members away
50 from said plate plane and that defines a clearance space
51 therein, a free end of said extension arm extends into said
52 clearance space, and said second vibration transducer
53 arrangement is coupled to said free end of said extension
54 arm and to said frame protrusion in said clearance space.

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